



# FORMER NAVAL AIR WARFARE CENTER WARMINSTER

## Technical Review Committee (TRC)

### January 27, 2016 Meeting Minutes

## FORMER NAVAL AIR WARFARE CENTER (NAWC) WARMINSTER

### TECHNICAL REVIEW COMMITTEE (TRC) MEETING MINUTES

#### JANUARY 27, 2016 MEETING

1. Meeting Date and Time: Wednesday, January 27, 2016, 9:30AM to 11:00AM
2. Location: WMA Board Room, 415 Gibson Ave., Warminster, PA
3. Attendees: See Attachment 1 (attendance list)
4. Summary of Meeting Discussions: See below and Attachment 2 (meeting agenda).

The meeting was called to order at approximately 9:30 a.m. by Mr. Willie Lin, the Base Realignment and Closure (BRAC) Environmental Coordinator (BEC) for the project working out of the Navy's BRAC Program Management Office (BRAC PMO) in Philadelphia. Mr. Lin asked those in attendance to sign in on the attendance list and announced that copies of the meeting agenda and presentation materials were available at the front of the room for anyone interested. Mr. Lin indicated that a notice for this public meeting was posted in the local newspaper and on the BRAC website. The meeting was then opened with a review of each agenda item followed by an opportunity for public comments and questions at the end of the meeting.

#### Administrative Update

Mr. Lin reviewed the purpose of the TRC and its role on the former NAWC Warminster project. The TRC for the former NAWC Warminster began meeting in 2012 after the Restoration Advisory Board (RAB) was adjourned. As was the protocol with RAB meetings, TRC meetings are open to the public and provide an update on the status of activities at the former NAWC Warminster site. Updates for the former NAWC Warminster site also are provided on the BRAC website and on EPA's new website for Warminster. These website addresses are provided on the meeting agenda (Attachment 2).

Mr. Lin indicated that the previous TRC meeting was conducted on May 15, 2014, and that all action items from the May 2014 meeting minutes have been addressed.

#### Other Navy Updates

Mr. Lin indicated that the Shenandoah Woods property, approximately 50+ acres currently owned by the Navy and formerly used for Navy housing, was found suitable for transfer in September 2015. The Navy is working with Warminster Township on transfer of the property.

Mr. Lin also indicated that the Navy has started the Five Year Review (FYR) process. This will be the fourth FYR conducted for the former NAWC Warminster site. All previous FYRs are available on the BRAC website. A public notice was posted in the local newspaper on January 21, 2016 to announce the beginning of the FYR process. Any members of the public interested in participating in the interview process for the FYR are asked to contact Mr. Lin directly at (215) 897-4900 or by email at [willie.lin@navy.mil](mailto:willie.lin@navy.mil). The purpose of the FYR is to ensure that the selected remedies at the former NAWC Warminster site are effectively protecting human health and the environment.



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### VOC Groundwater Extraction and Treatment Update

Ms. Jen Good (H&S Environmental, Inc.) presented an update on the status of volatile organic compound (VOC) groundwater extraction and treatment system (GWETS) (see Attachment 3). Updates included the pumping from Area D wells that was reinitiated in October/November 2014 after the presence of perfluorinated compounds (PFCs) was confirmed in this area; the change from reactivated coal-based carbon to Clagon FiltraSorb 600 to maximize PFC removal at the treatment plant; and an update on the pH pilot test for improved treatment of hexavalent chromium. Other details regarding miscellaneous maintenance and repair issues were also presented. Notable items covered include:

- The average GWETS flow rate was 125.2 gallons per minute (gpm) during the last reporting period in December 2015, including 57 gpm from Area A, 28.7 gpm from Area C and 39.5 gpm from Area D.
- Contaminant recovery rates for the GWETS were reported to be 4.01 lb of trichloroethene (TCE); 0.55 lb of tetrachloroethene (PCE); and 0.15 lb of carbon tetrachloride during the December 2015 reporting period.
- Pumps, motors, and various electrical components were replaced in Area D as needed to restart the extraction wells in October/November 2014.
- Regular maintenance and repair of other pumps and associated equipment continues to be ongoing as needed in Areas A and C.
- Piping and pump repairs for the equalization tank, air stripper, and liquid granular activated carbon equipment is scheduled for late February 2016. The GWETS will be shut down for approximately 1 week during these repairs.
- The most recent ion exchange resin change out associated with the pH adjustment pilot test was performed on July 2, 2015. The bed life for each batch of ion exchange resin utilized during this pH adjustment pilot test was reported to be 162 days, 189 days, 384 days, and 200 days of run time thus far on the most recent batch. The longer bed life noted during the more recent operating periods are likely associated with lower influent concentrations of hexavalent chromium. Hexavalent chromium concentrations will continue to be monitored at the GWETS and in Area A extraction wells, and the need for continued use of the pH adjustment system will be evaluated based on hexavalent chromium concentration trends.

### VOC Monitoring Activities and Reports Update

Ms. Good also presented an update on the status of groundwater monitoring activities at the former NAWC Warminster site (Attachment 3). Groundwater monitoring is conducted biannually, in the spring and fall of each year. The most recent sampling events were completed in May and November 2015.

During the May 2015 monitoring event, VOC samples were collected from 45 monitoring wells in Area A, 11 monitoring wells in Area C, and 16 monitoring wells in Area D. All extraction wells also were sampled for select PFCs, and Area A extraction wells also were sampled for hexavalent chromium. The May 2015 monitoring report was submitted for Navy review in January 2016.

During the November 2015 monitoring event, VOC samples were collected from 24 monitoring wells in Area A, 10 monitoring wells in Area C, and 9 monitoring wells in Area D. All extraction wells also were sampled for select PFCs, and Area A extraction wells also were sampled for hexavalent chromium. Data



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validation is currently in progress, and the draft report will be forthcoming. The next groundwater monitoring event is scheduled for May 2016.

Ms. Good also indicated that the annual land use control (LUC) inspection was completed in November 2015. No issues or deficiencies were observed during the inspection. A draft of the LUC inspection report is scheduled to be submitted in February 2016.

#### **Perfluorinated Compounds (PFC) Update**

Mr. Lin presented information regarding the current status of PFC monitoring that is ongoing at private wells in the vicinity of the former NAWC Warminster site. He noted that copies of a PFC Fact Sheet were available at the meeting. This is the same fact sheet that was previously made available during the public meeting held in Horsham and is available on the EPA and BRAC websites. Two poster boards also were available for review in the back of the room after the meeting for those interested.

Mr. Lin reviewed a timeline of the discovery of PFCs at the former NAWC Warminster site (Attachment 4), beginning in 2011 with the identification of PFCs as a new potential environmental issue in the third FYR. PFC sampling was conducted in Area C near the former Fire Fighting Training Area (FFTA) in 2011, and PFC sampling was expanded to other areas of the former NAWC Warminster site in 2012. PFC concentrations were identified above EPA's provisional health advisory (PHA) values in several onsite monitoring wells at this time. In 2013, the Navy sampled Warminster public supply well WMA-13, but PFC concentrations were not above PHA values. The Navy also reviewed potential PFC sources by initiating an evaluation of potential sources in 2013. Additional sampling of public supply wells was performed by the Warminster Municipal Authority (WMA) in 2014, and public supply wells WMA-10, WMA-13, and WMA-26 were shut down after elevated PFC detections were identified, and public notices were subsequently issued in June 2014. In July 2014, the Navy and EPA initiated a door to door public outreach with fact sheets and private well sampling. Public meetings were held in August 2014 and February 2015 informing the public on the presence of PFCs in groundwater near the former NAWC Warminster site. In 2015, the Navy awarded a \$3.9M cooperative agreement to WMA for carbon filtration systems on the impacted public supply wells, replacement of drinking water while the public supply wells are out of service, and for connection of homes with impacted private wells to the public supply system. By December 2015, all residential private wells with PFC concentrations at or above the PHA values had been connected to the public water supply.

Mr. Lin reported that a total of 114 private wells around the former NAWC Warminster site were sampled for PFCs. Of these locations, PFCs were detected at concentrations at or above the PHA values in 13 wells, and PFCs were detected at concentrations below the PHA values but greater than 1/4 of the PHA values at 13 other locations. Quarterly monitoring continues at locations where PFC concentrations are greater than 1/4 of the PHA values. Mr. Lin also explained that locations in western Warminster Township, near the Horsham Air National Guard Station, are addressed separately by the Air Force/Air National Guard.

Mr. Jeff Dale from the Navy then continued with a discussion of the PFC remedial investigation (RI) for the former NAWC Warminster site. Mr. Dale indicated that the final Unified Federal Policy-Sampling and Analysis Plan (UFP-SAP) was submitted on 11/10/15 and includes the following planned sample collection:



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- 40 new monitoring wells at 23 locations (17 nested wells)
- 48 soil samples (within suspected PFC source areas)
- 59 surface water samples
- 30 sediment samples (co-located with selected surface water samples)
- Private well sampling

Mr. Dale presented a map showing potential PFC source areas which were identified at the former NAWC Warminster site as part of the preliminary evaluation completed in 2013, including the FFTA, former landfill, Areas A and D waste disposal areas, a plane crash site near Bristol Road, plating operations in Area D, and two former fire houses. Mr. Dale then presented maps showing the location of proposed groundwater, soil, sediment, and surface water samples in relation to these potential source areas (Attachment 3). He indicated that new monitoring wells locations would be focused on public areas to allow for access during installation and subsequent sampling activities. Mr. Lin indicated that the Navy would be working with Warminster Township to identify suitable locations for placement of the new monitoring wells.

Mr. Lin then opened the meeting for comment and/or questions from the public.

#### Comments/Questions from the Public

Steve Wiesner from Warminster Township asked when the FYR was scheduled to be released. Mr. Lin indicated that the FYR will be issued by November 21, 2016, as indicated in the public notice. He also restated that anyone interested in participating in the FYR process can contact him directly. Ms. Sarah Kloss from EPA clarified that the recent public notice is to notify that the FYR process has been initiated, and that FYRs are required to be completed every five years.

Mr. Wiesner also asked whether the wells installed last year to support the Finding of Suitability to Transfer (FOST) at Shenandoah Woods have been sampled again after the initial sampling. Mr. Lin indicated that the wells have not been sampled since the FOST was signed, but they may be included as part of the PFC RI.

Mr. Kyle Bagenstose from the Bucks County Courier Times asked why the PFCs came up during the last FYR. Mr. Lin and Ms. Kloss explained that the EPA established PHA values for PFCs in 2009, so PFCs were identified as a new issue warranting investigation during the subsequent FYR at the site, which occurred in 2011.

Ms. Laura Werner from ATSDR/CDC stated that she has received some questions from the public about PFC exposure through fish consumption from local streams. She asked whether consumption of fish from local waterways is a concern. Mr. Dale indicated that this would be evaluated as part of the PFC RI through collection of surface water and sediment samples in nearby streams.

Ms. Werner also asked whether vapor intrusion has been evaluated as a potential exposure pathway at the former NAWC Warminster site. Mr. Dale stated that one structure from the former Base area required



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evaluation of vapor intrusion exposure. Indoor air and sub-slab samples were collected, and no vapor intrusion problems were identified.

Mr. Bob Nemeroff, Solicitor for the Warminster Township Municipal Authority, asked why PFCs were investigated at the former NAWC Warminster beginning in 2011. Mr. Lin explained that the PFC investigation was triggered during the last FYR conducted at that time. EPA established PHA values for PFCs in 2009, and PFCs were then identified as a potential new issue during the subsequent FYR completed in 2011.

Mr. Lin then closed by informing meeting participants that copies of all meeting presentations will be available with the meeting minutes on the BRAC website.

#### **Next TRC Meeting**

Next TRC meeting will be held on a date to be determined in August 2016 at the WMA Boardroom in Warminster, PA. A public notice will be issued in advance of the meeting.

#### **Meeting Adjourned**

Mr. Lin adjourned the meeting at approximately 10:30 a.m.



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## **ATTACHMENT 1**

### **Attendance List**





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NAME	AFFILIATION	PHONE	EMAIL
Carolyn Scale	Battelle	215 504 5003	scalac@battelle.org
Jeff Dale	NAVY	215-897-9914	jeffrey.m.dale@navy.mil
JEFF ORIENT	TERRA TECH	412-921-8778	jeff.orient@terratech.com
Sarah Bloss	US EPA	215-814-3379	sbloss.sarah@epa.gov
Lara Werner	ATSDR/CDC	215 814 3141	lwerner@cdc.gov
Kyle Borenstine	Battelle		kborenstine@battelle.com
Steve Wiesner	Warminster Twp.	215-443-5414	swiesner@warminsterpa.org
Katherine McQueen	Warminster Township	215-443-5414	kmcqueen@warminsterpa.org
Kathy Davies	US EPA	215-814-3315	kdavies.kathy@epa.gov
William Lin	U.S. NAVY	215-897-9500	william.lin@navy.mil
Dave Ferrin	Consultant to WMA	610 524-9366	dave.ferrin@consultant.com
Calvin Wade	PA DEP	484-250-5722	calvin.wade@pa.gov
Jen Good	HHS Environmental	508-366-7442	jen.good@hhs.gov
Tim Hagey	WTMA	215 675 3301 x 201	timh@warminsterauthority.com
Bob Deneroff	WTMA SOLICITOR	215-690-3827	rdeneroff@wtma.org
Dan Goode	USGS	717-571-8783	dgoode@usgs.gov



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## **ATTACHMENT 2**

### **Meeting Agenda**





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### AGENDA FORMER NAWC WARMINSTER Technical Review Committee (TRC) Meeting



**Date:** Wednesday, 27 January 2016

**Time:** 9:30 AM – 11:00 AM

**Location:** WMA Board Room, 415 Gibson Ave., Warminster, PA

- **Administrative Update [Navy]**
  - Technical Review Committee overview
  - Minutes of the last meeting (15 May 2014)
  - Review action items
- **VOC Groundwater Extraction and Treatment Update [Navy]**
  - Plant operating status
  - VOC removal evaluation
  - pH pilot update
- **VOC Monitoring Activities and Reports Update [Navy]**
  - Completed and planned monitoring
- **Perfluorinated Compounds (PFC) Update [Navy]**
  - PFC overview
  - Private well update
  - Remedial Investigation
- **Comments/questions from the public**
- **Next Meeting:** Date TBD, August 2016, WMA Board Room
- **Meeting Adjourned [Navy]**

**For additional information:**

**Navy website:**

[http://bracpmo.navy.mil/brac\\_bases/northeast/former\\_warfare\\_center\\_warminster.html](http://bracpmo.navy.mil/brac_bases/northeast/former_warfare_center_warminster.html)

**EPA Website:**

<http://cumulis.epa.gov/supercpad/cursites/csinfo.cfm?id=0302466>



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## **ATTACHMENT 3**

**Former NAWC Warminster Groundwater Treatment Plant (GWTP) Update**



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### Former NAWC Warminster Groundwater Treatment Plant (GWTP) Update Technical Review Committee (TRC) Meeting

Former NAWC Warminster  
Warminster, PA

27 January 2016

### Agenda



- VOC Groundwater Extraction and Treatment Update
  - Plant operating status
  - VOC removal evaluation
  - pH pilot update
- VOC Monitoring Activities and Reports Update
  - Completed and planned monitoring



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#### GWTP Operation

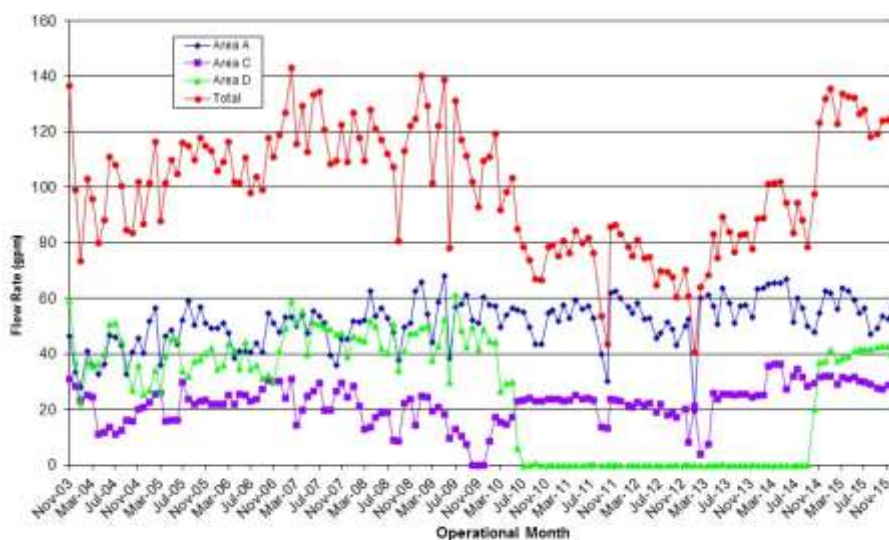


- Average flowrates for December 2015:
  - 57.0 gpm from Area A
  - 28.7 gpm from Area C
  - 39.5 gpm from Area D
  - 125.2 gpm overall
- Area C – Extraction wells EW-C16 and EW-C17 brought on-line in January 2014.
- Area D – Extraction wells EW-D1 – EW-D7 brought on-line in October / November 2014.
- 934,044,017 gallons treated through December 2015.

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#### GWTP Operation – Recovery Flow Rates



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### GWTP Operation – Recent Operational / Maintenance Activities



- Area D extraction wells refurbished and reactivated in October / November 2014:
  - Area D previously off-line since 2010, as VOC concentrations were below MCLs. Decision to reactivate EW-D1 – EW-D7 to address PFC concerns.
  - Replaced pumps, motors, various electrical components, etc. in Area D extraction wells in Fall 2014 and as needed throughout continued operation.
  - Installed concrete skirts around EW-D4 and EW-D5 vaults in December 2015.



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### GWTP Operation – Recent Operational / Maintenance Activities



- Other extraction well repairs and repairs within GWTP:
  - 14 Area A EWs, 5 Area C EWs, 7 Area D EWs currently active
    - Regular maintenance / repair / replacement required for pumps, motors, control box components, totalizers, level probes, etc. - ongoing
  - Continued maintenance / repair / replacement of system components:
    - Process transfer pumps (EQ tank and air stripper transfer pumps), bag filter units, miscellaneous valves, vacuum breakers, etc.



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### GWTP Operation – Recent Operational / Maintenance Activities




➤ Upcoming repairs:

- Pull and replace pump/motor for EW-D3 and EW-D5. Repair EW-D5 motor starter.
- Piping and pump pad repairs to EQ tank and air stripper transfer pumps and effluent run from LGAC units to outside plant.
  - Tentative schedule – late-February 2016.
  - GWTP to be off-line ~1 week during repairs.

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### GWTP Operation – Recent Operational / Maintenance Activities



➤ Liquid Granular Activated Carbon (LGAC) – Vessel Repairs / Changeout:

- 2014-2015:
  - Repaired both LGAC vessels by replacing doors with stainless steel.
  - Switched from using reactivated coal-based carbon to Calgon FiltraSorb 600, to maximize PFC removal.
  - Changed to using both LGAC vessels with 18,000 lb of carbon in each.
- Current operation – Two carbon vessels operating in series, each containing 18,000 lb of Calgon FiltraSorb 600.
- Future changeouts – changeout primary (lead) vessel, switch lead and lag vessels.



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#### GWTP Operation – VOC Mass Removal

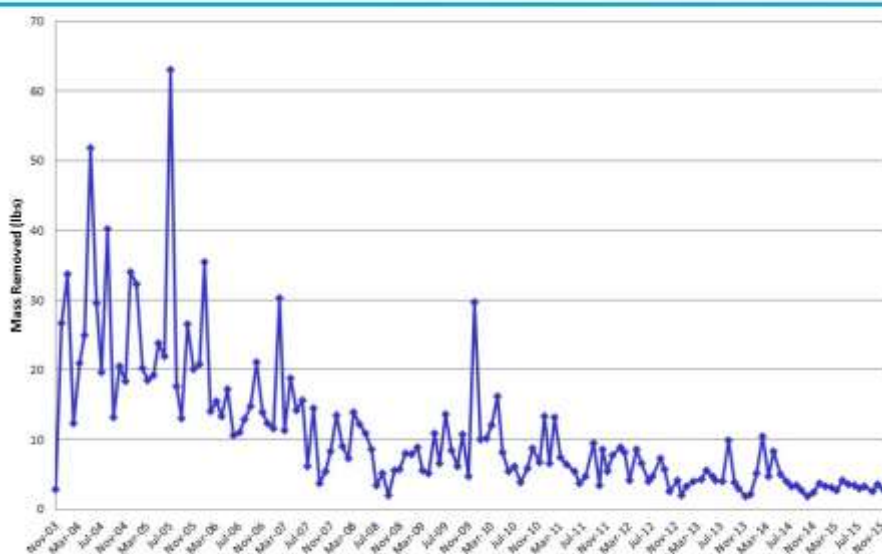


- Cumulative dissolved-phase VOC recovery through December 2015 reporting period:
  - Trichloroethene (TCE) – 4,863 pounds (4.01 lbs in 12/15)
  - Tetrachloroethene (PCE) – 159 pounds (0.55 lbs in 12/15)
  - Carbon Tetrachloride (CCl<sub>4</sub>) – 165 pounds (0.15 lbs in 12/15)
- Majority of VOC recovery is from Area A (3.97 lbs TCE, 0.42 lbs PCE, and 0.15 lbs CCl<sub>4</sub> in 12/15)
  - Remainder of TCE recovery from Area D (0.04 lbs in 12/15)
  - Remainder of PCE recovery from Area C (0.12 lbs in 12/15) and Area D (0.02 lbs in 12/15).

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#### VOC Removal Evaluation – TCE Recovery Rate



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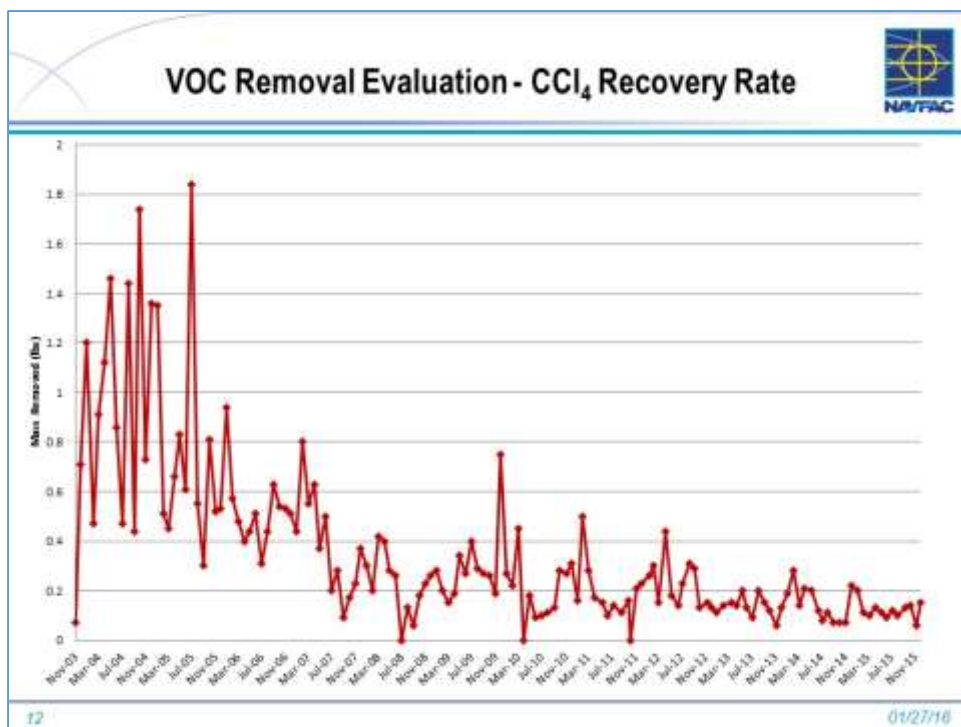
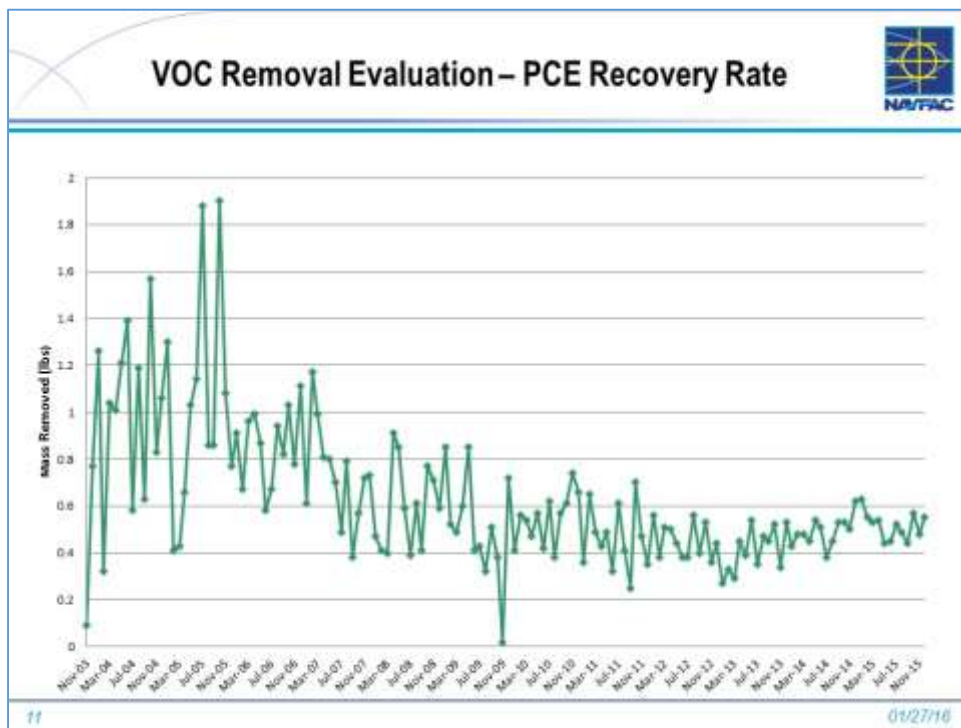
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### GWTP Operation – pH Pilot Update



- Background:
  - Objective: To improve the removal efficiency of Cr+6 from the Area A process stream using the existing ion exchange treatment system.
  - Adjusts pH to ~6.0 S.U. to increase the capacity of the resin.
- Obtained concurrence from PADEP and EPA for implementation of pH adjustment system pilot study.
- Pilot testing began in April 2013. Weekly to bi-weekly samples of resin influent and effluent collected to determine life cycle of resin using pH adjustment.
- pH adjustment system incorporated into NPDES permit during permit renewal (October 2013).

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### GWTP Operation – pH Pilot Update



Overall view



pH meter/controller,  
sample ports

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#### GWTP Operation – pH Pilot Update



- Run #1:
  - Operated for 162 days before full breakthrough was realized.
  - Average resin influent concentration of Cr+6 of 9.2 ug/L.
  - Average HCl usage of 6.0 gpd to maintain pH of 6.0.
  - Resin was changed out on 11/07/13.
- Run #2:
  - Operated for 189 days before full breakthrough was realized.
  - Average resin influent concentration of Cr+6 of 8.7 ug/L.
  - Average HCl usage of 7.0 gpd to maintain pH of 6.0.
  - Resin was changed out on 06/03/14.
- Run #3:
  - Operated for 384 days before full breakthrough was realized.
  - Average resin influent concentration of Cr+6 of 7.2 ug/L.
  - Average HCl usage of 4.4 gpd to maintain pH of 6.0.
  - Resin was changed out on 07/02/15.
- Run #4:
  - Currently 200 days into Run #4, have not yet realized full breakthrough.
  - Average resin influent concentration of Cr+6 of 3.2 ug/L.
  - Average HCl usage of 4.2 gpd to maintain pH of 6.0.

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#### GWTP Operation – pH Pilot Update



- Analyzed individual Area A extraction wells for Cr+6 in conjunction with semi-annual LTM events:
- May 2014:
  - Results ranged from non-detect (MDL of 1.9 ug/L) in nine EWs to 43 ug/L at EW-A19.
  - Concentrations at EW-A1, EW-A2, EW-A5, and EW-A19 above treated effluent permit limit of 14 ug/L.
- November 2014:
  - Results ranged from non-detect (MDL of 1.9 ug/L) in ten EWs to 20 ug/L at EW-A19.
  - Concentrations at EW-A2 and EW-A19 above treated effluent permit limit of 14 ug/L.
- May 2015:
  - Results ranged from non-detect (MDL of 2.1 ug/L) in eight EWs to 27 ug/L at EW-A2 (EW-A19 at 25 ug/L).
  - Concentrations at EW-A2, EW-A3, and EW-A19 above treated effluent permit limit of 14 ug/L.
- November 2015:
  - Results ranged from non-detect (MDL of 2.1 ug/L) in five EWs to 34 ug/L at EW-A8 (EW-A19 at 20 ug/L).
  - Concentrations at EW-A2, EW-A4, EW-A8, EW-A15 (inactive), and EW-A19 above treated effluent permit limit of 14 ug/L.

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#### GWTP Operation – pH Pilot Update



##### ➤ Recent Activities:

- Repaired failed check valve on HCl metering pump on 4 June 2015.
- Performed most recent resin changeout on 2 July 2015.
- Replaced faulty pH probe on 11 August 2015.
- Replaced failed HCl metering pump on 12 January 2016.
- Ongoing HCl deliveries, pH probe calibration, and bi-monthly sample collection.

##### ➤ Path Forward:

- Evaluate continued need of pH adjustment system based on Cr+6 trends observed in Area A influent.
- Continue to collect Cr+6 samples from Area A extraction wells, and begin to collect Cr+6 samples from Area D extraction wells, in conjunction with Annual (Spring) LTM events.

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#### VOC Monitoring Activities and Reports Update



##### ➤ Spring 2015 Monitoring Activities:

- Groundwater sampling event performed in May 2015 (05/26/15 – 05/29/15):
  - Area A – 45 wells sampled for select VOCs, GW elevations from 66 wells.
  - Area C – 11 wells sampled for select VOCs, GW elevations from 25 wells.
  - Area D – 16 wells sampled for select VOCs, GW elevations from 37 wells.
  - Area A, Area C, Area D extraction wells sampled for select PFCs.
  - Area A extraction wells sampled for hexavalent chromium.

##### ➤ LTM Report submitted in January 2016.

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#### VOC Monitoring Activities and Reports Update



- Fall 2015 Monitoring Activities:
  - Groundwater sampling event performed in November 2015 (11/16/15 – 11/19/15):
    - Area A – 24 wells sampled for select VOCs, GW elevations from 66 wells.
    - Area C – 10 wells sampled for select VOCs, GW elevations from 25 wells.
    - Area D – 9 wells sampled for select VOCs, GW elevations from 37 wells.
    - Area A, Area C, Area D extraction wells sampled for select PFCs.
    - Area A extraction wells sampled for hexavalent chromium.
- Data validation currently in progress, report to follow.

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#### VOC Monitoring Activities and Reports Update



- Fall 2015 LUC Inspection:
  - On-site inspection completed on 19 November 2015.
  - No issues/ deficiencies observed during inspection.
  - Document search followed.
- Report to be submitted in February 2016.



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#### VOC Monitoring Activities and Reports Update



##### ➤ Planned Monitoring Activities:

- Next groundwater sampling event to be performed in May 2016:
  - Area A – 45 wells to be sampled for select VOCs, GW elevations from 66 wells.
  - Area C – 12 wells to be sampled for select VOCs, GW elevations from 25 wells.
  - Area D – 16 wells to be sampled for select VOCs, GW elevations from 37 wells.
  - Area A, Area C, Area D extraction wells to be sampled for select PFCs.
  - Area A and Area D extraction wells to be sampled for hexavalent chromium.



## **FORMER NAVAL AIR WARFARE CENTER WARMINSTER**

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### **ATTACHMENT 4**

**PFCs at Former NAWC Warminster**



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### PFCs at Former NAWC Warminster

NAWC Warminster Technical Review  
Committee Meeting - January 27, 2016

Presented By  
Wilmington Lin  
NAVFAC BRAC PMO East

### Outline



- PFC overview
- Private well sampling for PFCs
- PFC remedial investigation (RI)



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### Overview – Background Information



- Perfluorinated compounds (PFC) are considered emerging contaminants by the Environmental Protection Agency (EPA). Perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) have provisional health advisory (PHA) values established by EPA in 2009; PFOS is 0.2 µg/L; PFOA is 0.4 µg/L. µg/L is one part-per-billion.
- PFOS and PFOA are man-made chemicals, break-down slowly, and are used in many different products including cookware, and fire-fighting foams. There is limited but growing information on environmental and health effects due to PFOS and PFOA. (see EPA fact sheet)
- EPA uses the Unregulated Contaminant Monitoring Rule (UCMR) program to collect data for contaminants suspected to be present in drinking water.
  - UCMR Monitoring is required for public water systems serving greater than 10,000 persons. Data collection was from 2013 through 2015.
  - EPA is working to improve its understanding of the prevalence and toxicity of these chemicals to determine if safe drinking water regulatory limits are needed.

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### Former NAWC Warminster Timeline (1/3)



2011

- The Five Year Review process identified PFOS/PFOA as a new environmental issue at the former NAWC Warminster. Limited sampling conducted during the Five Year Review process identified PFOA in Area C groundwater as a potential concern. The former Fire Fighting Training area is located in Area C.

2012

- Navy expanded groundwater sampling in Area C. Concentrations of PFOS/PFOA above the PHA levels were found in several onsite monitoring wells.

2013

- Navy performed additional sampling including sampling public supply well, WMA-13. PFOS/PFOA are detected in WMA-13, but not above the PHA level.
- Navy began reviewing potential sources of PFOS and PFOA by initiating a preliminary evaluation of source report.

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## Technical Review Committee (TRC)

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#### Former NAWC Warminster Timeline (2/3)



##### 2014

- Warminster Municipal Authority (WMA) samples drinking water per the third Unregulated Contaminant Monitoring Rule (UCMR3).
- June: Navy and EPA completes interagency agreement for private well sampling/analysis. UCMR3 data reviewed for WMA Wells 10, 13 and 26. These wells were shut down and public notices issued.
- July: EPA orders Navy to provide carbon treatment at WMA public wells and provide permanent safe drinking water for private wells who are at or above the PHA levels. EPA initiates door to door public outreach with fact sheets and private well sampling.
- August: Open-house public meeting, over 200 attended. Health officials and drinking water professionals participated.

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#### Former NAWC Warminster Timeline (3/3)



##### 2015

- February, public open-house meetings for Warminster, Horsham, and Warrington Townships. All three public water authorities, county and federal health professionals available.
- March, the Navy awards \$3.9M cooperative agreement to WMA
  - Carbon filtration systems at three WMA public water wells that are at/above the PHA levels
  - Reimbursing the water authority for replacement drinking water after the three wells were removed from service.
  - Implementing water connections for private drinking water wells with levels of certain PFCs at/above the PHA levels.
- December, WMA completes all residential connections of private wells which are at/above the PHA levels to public water.

6

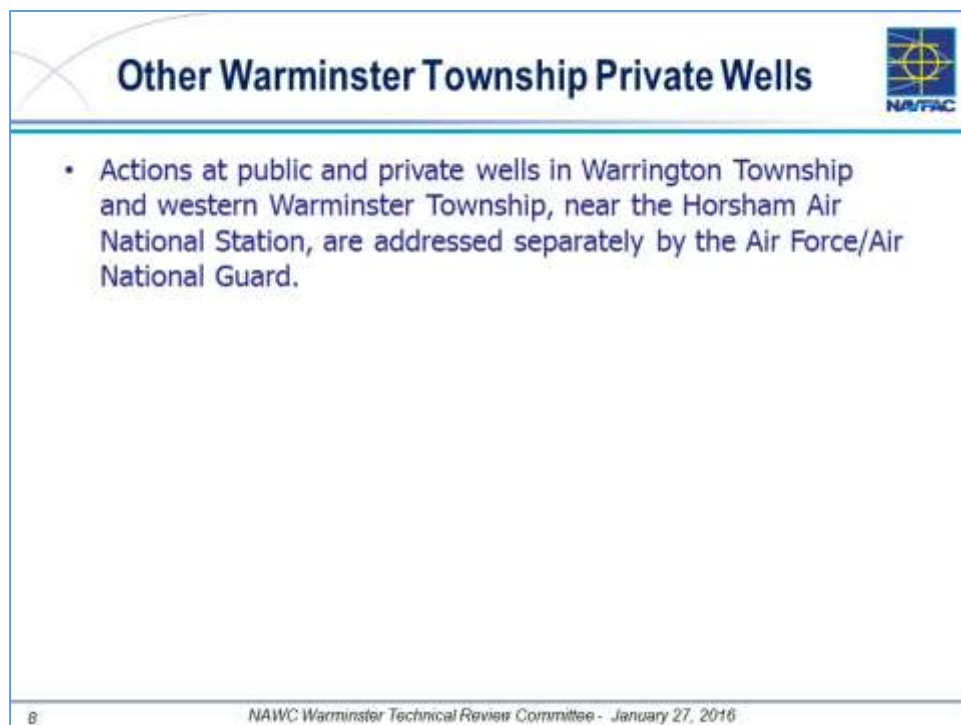
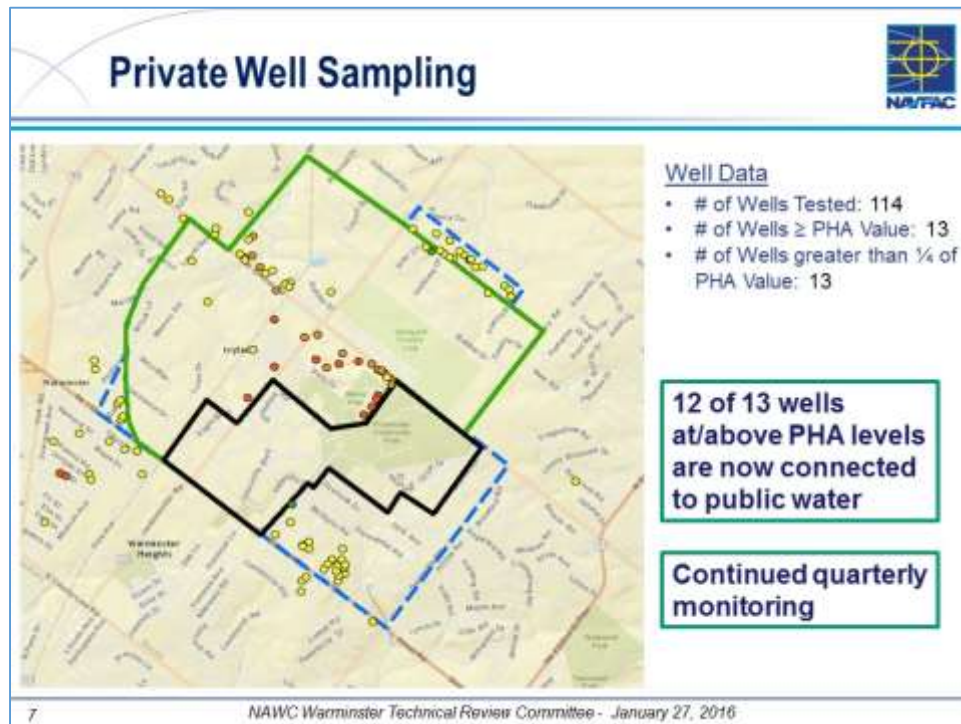
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### PFC Remedial Investigation (RI) Summary



- 40 new monitoring wells at 23 locations (17 nested wells)
- 48 soil samples (within suspected PFC source areas)
- 59 surface water samples
- 30 sediment samples (co-located with selected surface water samples)
- 98 groundwater samples
- Private well sampling
  - 40 new monitoring well locations
  - 58 existing monitoring wells
- Final UFP-SAP submitted 11/10/15



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### Warminster PFOS/PFOA Source Areas



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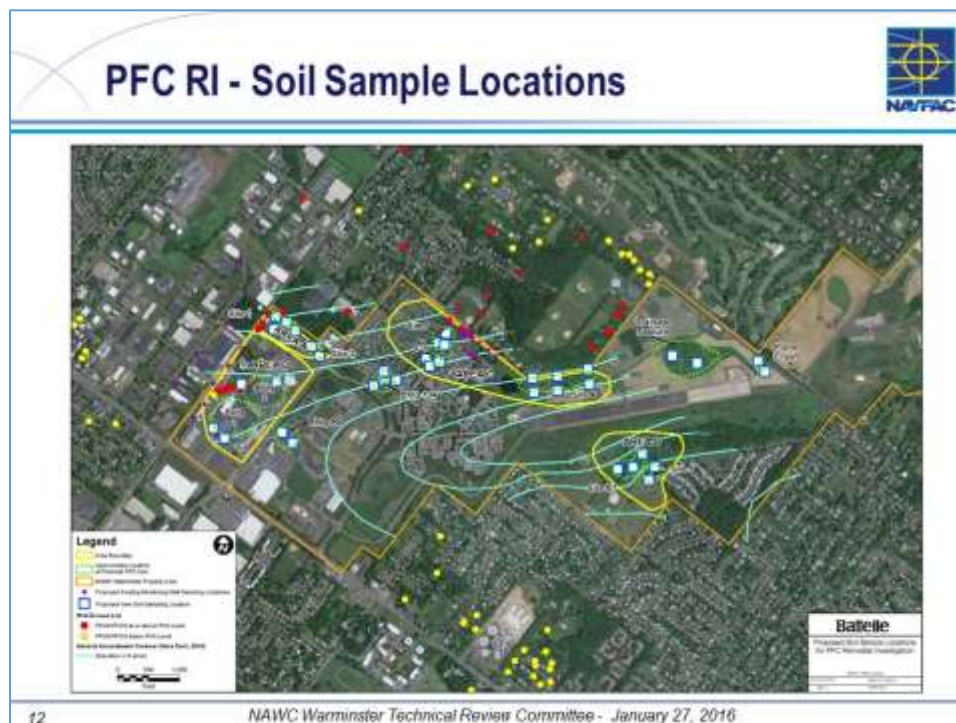
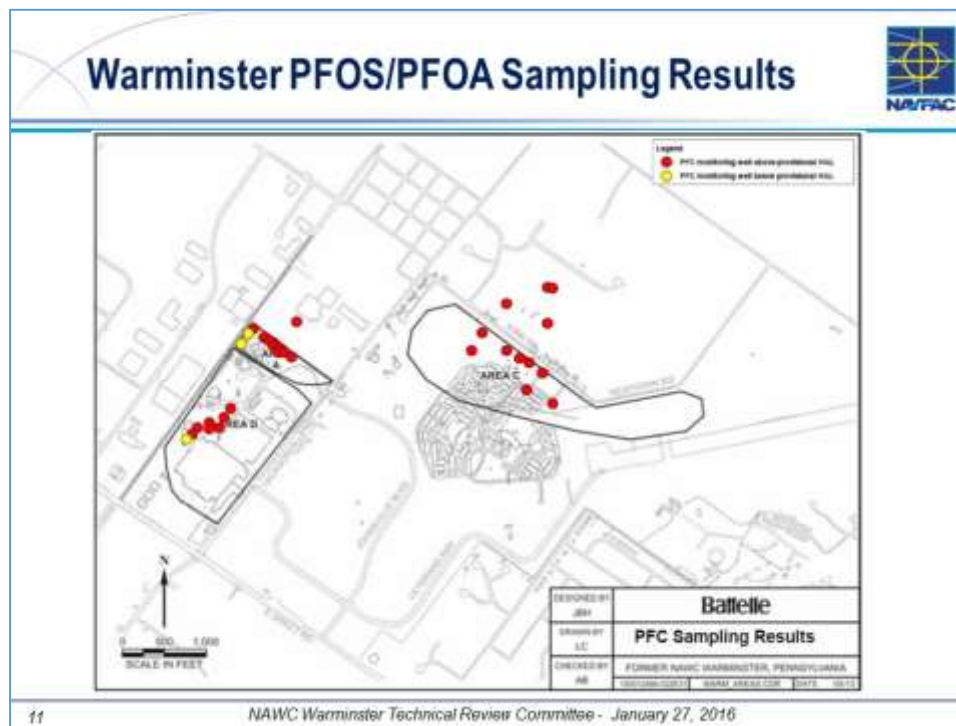
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